Semantic Mediation Tool for Risk Reduction, Phase I

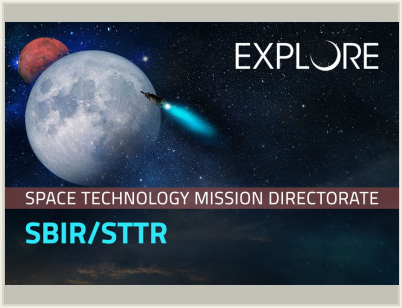
Completed Technology Project (2004 - 2004)

Project Introduction

This project focuses on providing an infrastructure to aid the building of ontologies from existing NASA applications, in a manner that leads to long-term risk reduction. Currently numerous stove-pipe systems are in existence in the ISS (International Space Station) and Space Shuttle Program (SSP) which need to be integrated for studying the operational trade-offs through various risk-analysis tools. However, knowledge inside and across such systems has to be captured in ontologies for such systems, at appropriate abstraction levels and in a reliable manner, so that they can be analyzed holistically by existing tools. Based on our experience in using a clustering approach for analyzing knowledge bases from both NASA and non-NASA systems, we propose to build a semantic mediation toolkit that focuses on providing various types of ontological engineering aids during knowledge entry, leading to long-term quality assurance and interoperability of NASA systems. In Phase I of this project, the feasibility of applying Pragatiys MVP-CA methodology on a candidate system relevant to NASA will be demonstrated. In particular we will demonstrate feasibility of automating detection of ontological concepts, quality assurance issues and mapping and merging of concepts from NASA systems so as to lead to long-term risk reduction. The ultimate aim of the project is to reduce the risks involved in utilizing ontologies built for NASA systems.

Anticipated Benefits

The methodology for automated aids for ontological engineering can be transitioned to other applications areas such as, medical, forensics, civil engineering , etc. where ontologies are getting built. We envision that the semantic mediation aid toolkit based on MVP-CA technology will be used by knowledge engineers and domain experts for discovering the underlying system structure in legacy systems as well as tracking changes of an evolving system. This product could be available either as a stand-alone version or as a part of the knowledge-based systems shell to offer software life cycle support and knowledge management.



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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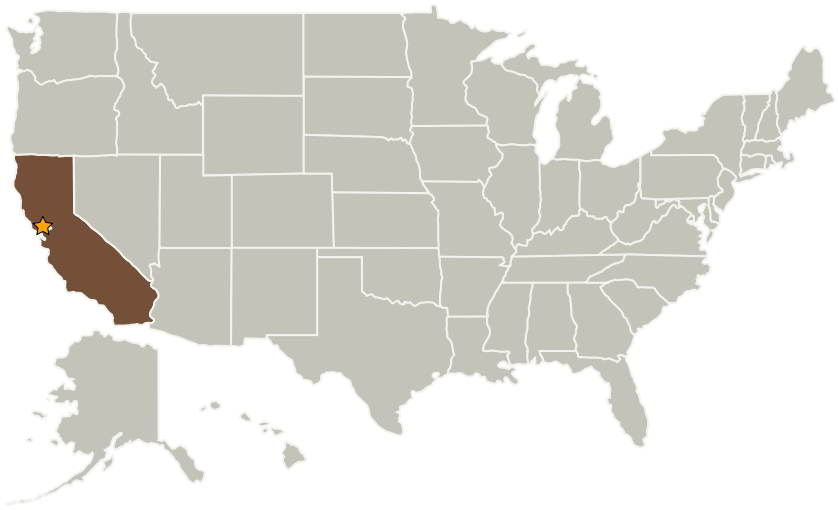
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Pragati Synergetic Research, Inc.	Supporting Organization	Industry	Cupertino, California

Primary U.S. Work Locations
California

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Project Manager:
Deepak S Kulkarni

Principal Investigator:
Mala Mehrotra

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.7 Verification and Validation of Thermal Management Systems